

# BRECCIA PIPE AND GEOLOGIC MAP

# OF THE NORTHEASTERN HUALAPAI INDIAN RESERVATION AND VICINITY, ARIZONA

By

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The map shows a coastal region with several contour lines indicating elevation. A north arrow is located in the upper left corner, pointing upwards and labeled "TRUE NORTH" and "MAGNETIC NORTH". Below the north arrow is the text "APPROXIMATE MEAN DECLINATION 1925". The map includes a scale bar at the bottom with two horizontal lines. The top line has tick marks for  $\frac{1}{2}$ , 0, and 1 MILE. The bottom line has tick marks for  $\frac{1}{2}$ , 0, and 1 KILOMETER. The text "SCALE 1:48,000" is centered above the scale bar. At the bottom center, the text "CONTOUR INTERVALS" is followed by a series of numbers: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200.

**Map symbols**

**CONTACT**

FAULT—bar and ball on down thrown side; dashed where inferred, dotted where approximately located; R on reverse faults, 45—approximate displacement in feet.

**STRIKE AND DIP OF BEDS.**

MONOCLINE—Axis located approximately midway between anticlinal and synclinal hinges of fold. Length of arrow indicates approximate map distance between fold hinges; dotted where concealed, dashed where fold dies out.

SYNCLINE—Trace of axial plane and direction of plunge; dashed where fold dies out; dotted where concealed.

ANTICLINE—Trace of axial plane and direction of plunge; dashed where fold dies out; dotted where concealed.

M3      UPPER AMPHIBOLITE FACIES.

16      STRIKE AND DIP OF FOLIATION, 67, dip of foliation in degrees.

(↑↓)      RIVER ANTICLINES—Axial crests follow coarse of tributary canyons or the Colorado River; parentheses bracket individual anticlines.

\*      VOLCANIC VENTS.

## CORRELATION OF MAP UNITS

**Surficial and Volcanic Deposits**

Qd QI QC QTg QI Qb Qbc QTl QTt QTl QTg

Ttw

Holocene  
Pleistocene  
Pliocene  
Miocene  
Oligocene

**Sedimentary Rocks**

**Unconformity**

Tm

Unconformity

Pk

Unconformity

Pt  
Pc  
Ph

Unconformity

Ps Pe

Supai Group

Unconformity

Msc

Unconformity

Mr

Unconformity

Dtb

Unconformity

Gm  
Cba  
Ct

Tonto Group

Middle? and Lower Triassic

Lower Permian

Upper and Lower Pennsylvanian

Upper and Lower Mississippian

Upper and Middle Devonian

Middle and Lower Cambrian

**Metamorphic Rocks**

**Unconformity**

Pcgw  
Pcgp  
Pevn

Vishnu Group

Older Precambrian

Collapse feature classification*	
	B Brecciated rock observed in the field.
	M Mineralized rock (either visible copper minerals or surface radiation greater than two and a half times background) present.
	C1 Concentrically inward-dipping beds and visible alteration (bleaching or limonite staining).
	C2 Concentrically inward-dipping beds; no visible alteration.
	C3 Visible alteration; no visible dipping beds.
	C4 Distinctly circular feature, either due to vegetation or topography; no visible alteration or dipping beds.
	C? Questionable. A circular feature appears to be present, but with no obvious dipping beds, alteration, vegetation change or topography delineation.
	B Breccia pipes mapped by Huntoon and Billingsley (1981), Billingsley and Huntoon (1983), and this map. Outline of pipe is shown by a solid dot and not mapped to scale.
	C Collapse structures mapped by Huntoon and Billingsley (1981), Billingsley and Huntoon (1983), and this map. Outline of pipe is shown by a solid dot and not mapped to scale.
	S Sink holes.
	Cu Copper prospect; may or may not be a breccia pipe.

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. (Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.) (Released in response to a freedom of information act request.)

Base from U.S. Geological Survey 1:24,000 Granite Park (1967), Hockey Puck Spring (1967), MT Logan (1967), MT Trumbull SE (1967), National Tank (1981), Prospect Point (1967), Supal Camp (1981), Vulcans Throne (1967), Vulcans Throne SE (1967), Vulcans Throne SW (1967), Whitmore Point (1967), Whitmore Point SE (1967), Whitmore Rapids (1967), 1:62,500 National Canyon (1962), and Tuckup Canyon (1962), Arizona.

